

REMARKS

Applicants' undersigned representative thanks the examiner for her courtesies during an Office Interview on November 17, 2004.

Claim Amendment and Claim Rejections Under 35 U.S.C. § 112, ¶ 1

Applicants respectfully request that amendments to Claims 40, 48, 80, 81 and 83, as indicated above, be entered. It is respectfully submitted that these amendments are adequately supported by the specification as originally filed, merely clarify that which applicants consider their inventions, and do not raise any new issues of patentability. For example, as explained in more detail below, support for the recitation of "80% to 100%" can be found, for example, in Figures 7 and 12.

The Office Action asserted that there is no support for the recitations in the claims of "about 80% or greater" and "about 95% or greater," and rejected Claims 40-51 and 79-86 for alleged "lack of written description" under 35 U.S.C. § 112, first paragraph. Applicants respectfully disagree and request withdrawal of this rejection. Figure 7 provides a *continuous line* showing that, as the Ni:Al ratio changes, the conversion rate increases from under 40%, peaks at around 99% and then drops to below 40% again. Accordingly, this graph provides support for every data point in this range. Furthermore, Figure 12 (Example 14) provides support for the conversion rate of 100%. Accordingly, the specification as originally filed provides adequate written description for the claim language. In order to expedite prosecution, applicants have amended the claims to "80% to 100%," further clarifying the claims, and overcoming the claim rejection.

Claim Rejection under 35 U.S.C. § 103

The Office Action maintained the rejections of claims 40-51, and 79-86 for alleged obviousness over Rossin *et al.* (U.S. Pat. No. 6,069,291), optionally in view of Okazake *et al.* (U.S. Pat. No. 5,151,263) and Imaura (U.S. Pat. No.

5,649,985). Applicants respectfully submit that this rejection is improper and should be withdrawn.

The Office Action states that Rossin *et al.* discloses that perfluoroalkanes at a concentration of 5,000 ppm can be treated, in the presence of oxygen and water, with an aluminum oxide catalyst, which can be stabilized with any of numerous metal and non-metal elements, including Ni. The Office Action cites *Merck & Co. Inc. v. Biocraft Laboratory Inc.*, 874 F.2d 804, 10 USPQ2d 1843, 1846 (Fed. Cir.) *cert. denied*, 493 U.S. 975 (1989), apparently for the proposition that selecting one compound among a range of compounds would be *prima facie* obvious.

As an initial matter, *Merck v. Biocraft* does not establish a rule that a disclosed broad genus *per se* renders obvious a species encompassed thereby. To the contrary, it is well established that “[t]he fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious.” *In re Baird*, 16 F.3d 380, 382, 29 USPQ2d 1550, 1552 (Fed. Cir. 1994). See also *In re Jones*, 958 F.2d 347, 350, 21 USPQ2d 1941, 1943 (Fed. Cir. 1992) (Federal Circuit has “decline[d] to extract from *Merck [v. Biocraft]* the rule that... regardless of how broad, a disclosure of a chemical genus renders obvious any species that happens to fall within it.”).

In any case, the claims under rejection in the instant case are **method** claims, not the chemical composition claims discussed in *Merck v. Biocraft*.

a. The Instantly Claimed Methods Achieve Superior Results Not Expectable From the Prior Art

Properly framed, the issue in the instant case is whether Rossin *et al.*, which discloses aluminum catalysts that can be stabilized with numerous other elements, renders obvious a method that specifically uses an aluminum-**nickel** oxide catalyst for treating a **gas containing 0.5% to 10% fluorine compounds** and that achieves a **conversion rate of 80-100%, for an extended period of**

time. Because (1) data from comparative experiments contained in the Specification and two declarations by one of the inventors (Mr. Kanno) convincingly show that the instantly claimed methods achieve superior and unexpected results of increased catalyst reactivity for an extended period of time at high starting fluorine compound concentrations of 5,000 ppm or higher, and (2) Rossin *et al.* merely mentions that many metal and non-metal elements could be used to *stabilize* an aluminum catalyst, but does not teach or suggest which of these elements would accomplish an increased catalyst reactivity with high starting fluorine compound concentrations for an extended period of time, the instantly claimed methods are not obvious over the cited prior art and should be allowable.

Specifically, Example 6 of the Specification compares various catalysts containing alumina and another element. The results are summarized in Figure 6. This *side-by-side* comparison of many catalysts showed that the two containing Ni were superior in achieving *high reduction rate* of CF compounds.

Furthermore, in his February 7, 2002 Declaration (“the First Kanno Declaration”), Mr. Kanno declared that “[o]ne skilled in the art would have expected a rapid deterioration of catalytic activity during treatment of a gas having a concentration of 5,000 ppm of a fluorine compound.” This statement is supported by data contained in Rossin *et al.* itself as well as by Mr. Kanno’s September 12, 2003 declaration (“Second Kanno Declaration”).

With the exception of Examples XV and XVII, all test runs of Rossin *et al.* lasted less than 100 hours (Example I: 18.5 hours and 32.5 hrs.; Example II: 19.5 and 24.5 hrs.; Example VII: 19 hrs.; Example IX: 43 hrs.; Example XI: 17.5 hours; and Example XVIII: 78 hours.) When the catalysts were tested for an extended time period, Rossin *et al.* itself showed even at a starting concentration of 500 ppm, the conversion rate of some of its catalysts dropped rapidly. For example, in Example XV, the conversion rate dropped from 90-95% in the first 20 hours to about 90% up to the first 340 hours, and below 90% after 340 hours.

In the Second Kanno Declaration, Mr. Kanno prepared a Co/Zr/Al catalyst according to Example XVI of Rossin *et al.*, and compared its reactivity when the concentration of the fluorine compounds was 500 ppm vs. 5,000 ppm. The results showed that while this Co/Zr/Al catalyst was able to maintain a high conversion rate for over 99% for 2000 hours when the concentration of the fluorine compound was 500 ppm, the conversion rate dropped rapidly and dramatically (to about 35%) after just 170 hours when the concentration of the fluorine compound was 5,000 ppm.

The First Kanno Declaration further stated that a high fluorine compound concentration (5,000 ppm and above) “is typically encountered in commercial applications rather than a lower concentration of only 500 ppm as disclosed in Rossin.” The First Kanno Declaration further presented data showing that the presently claimed method using the Al/Ni catalyst achieved a high reduction rate for a much longer period of time (2000⁺ and 4000⁺ hours), representing at least a 5- and 10-fold increase, compared to the longest run of 400 hours in Rossin *et al.*

Thus, the data in Figure 6 of the Specification and the two Kanno declarations, in combination, showed that Al/Ni catalysts were superior in terms of achieving a high reduction rate when *the starting CF concentration was 5,000 pm or higher*, and maintaining the high reduction rate for a longer period of time than catalysts containing other elements.

These superior results were achieved because Ni was found, surprisingly, to form a composite oxide and to *activate* the catalyst more than the other elements and maintain the high reduction rate for a longer period of time. See e.g. page 10, lines 1-9 of the Specification. Rossin *et al.* does not in any way teach or suggest that the reactivity (reduction rate) of the catalyst can be increased with the other elements. In contrast, Rossin *et al.* merely mentioned that many metal and non-metal elements could be used to *stabilize* the catalysts. See Rossin *et al.*, Col. 3, lines 1-7, and lines 33-41. This explains why Rossin *et al.*, although mentioning Ni as one possible element out of 17 metal and non-

metal elements, states that its “*more preferred embodiments*” are cerium, titanium or zirconium, *not Ni* (see Rossin *et al.*, col. 4, lines 4-6). There is no suggestion or motivation in Rossin *et al.* to specifically select nickel, nor would there have been any reasonable expectation in Rossin *et al.* alone, or in combination with any other references, that an Al/Ni catalyst would be used, as in the claimed method, to achieve the superior and unexpected results of the presently claimed invention.

During the Office Interview on November 17, 2004, the Examiner raised two issues with the data in the specification: (1) the compound used was C₂F₆, while Rossin’s Example XIX, the only test where the starting concentration of the fluorine compound is 5,000 ppm, used CF₄, which was “harder to break”; and (2) there was no indication that the catalysts in Figure 6 of the Specification were made exactly as in Rossin *et al.* The Examiner further faulted the data in the first Kanno Declaration as not containing side-by-side comparisons; and the second Kanno Declaration used C₂F₆ as the test compound and was a test with Co/Al/Zr only. Because of the alleged “deficiencies” in the data, the Examiner was of the opinion that there was no comparison between the claimed invention and “the closest prior art,” and that the data failed to show that the claimed invention achieves unexpected results.

Applicants respectfully disagree. As an initial matter, applicants note that Example XIX of Rossin *et al.* and several other examples conspicuously omit the information on the duration of the test run in Example XIX. In addition, Claim 3 of Rossin *et al.* only recites 78 hours when the starting fluorine compound concentration is 1,000 ppm. This indicates that the catalyst in Rossin *et al.* do not possess the superior characteristics of the instantly claimed invention.

In any event, it is respectfully submitted that the examiner applied an improper standard. When analyzed under the proper legal standard, the data in

combination showed that the claimed invention achieves superior and unexpected results.

In essence, the Examiner argues that (1) Rossin suggested that all elements listed there are equivalent and equally good; and (2) the test results merely showed that Ni/Al is superior under certain specific conditions for a particular CF compound, but applicants had not shown that Ni/Al is superior under *all claimed conditions*. In other words, it appears to be the Examiner's position that from Rossin's teachings, Ni/Al *may* not be superior under some unspecified conditions. However, because *all* available data suggest that Ni/Al catalysts of the instant invention are superior, *unless the examiner is able to articulate a reasonable basis to conclude otherwise*, there is no reason to assert that the superiority of the Ni/Al catalysts is condition-specific. Moreover, the law is clear that applicants are not required to show unexpected results over the entire range of properties. See, e.g., *In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987) (When considering whether proffered evidence is commensurate in scope with the claimed invention, it is not required that the applicant show unexpected results over the entire range of properties possessed by a chemical compound or composition.). Evidence that the invention possesses superior and unexpected properties in one of a spectrum of conditions is sufficient to rebut a *prima facie* case of obviousness. *Id.*

In short, there is nothing in the Rossin patent or anywhere else that would lead one of ordinary skill in the art to believe that the test results are "condition-specific" or not universally applicable. Furthermore, even if the superior results are "condition specific," they are legally sufficient to rebut the *prima facie* case of obviousness.

b. There Is No Need to Recite in the Claims the Time Period of High Reduction Rate Achieved by the Claimed Methods

During the Office Interview, the Examiner also stated that the claims are not "commensurate in scope with the data in the specification and the

Declarations,” suggesting that the claims need to recite that the Ni/Al catalysts can maintain the higher reduction for a time period longer than those in Rossin *et al.* Applicants respectfully disagree. The law requires only that the claims define the invention, not what the invention can accomplish. The claims recite the conditions under which the superior results are achieved, and under such conditions, the superior results are a *necessary result* of the claimed method. “In determining whether the invention as a whole would have been obvious under 35 U.S.C. 103, we must first delineate the invention as a whole. In delineating the invention as a whole, we look not only to the subject matter which is literally recited in the claim in question ... but also to those properties of the subject matter which are inherent in the subject matter. ... Just as we look to a chemical and its properties when we examine the obviousness of a composition of matter claim, it is this invention *as a whole*, and not some part of it, which must be obvious under 35 U.S.C. 103.” *In re Antonie*, 559 F.2d 618, 620, 195 USPQ 6, 8 (CCPA 1977) (italics original, underline added) (citations omitted). In fact, not only the unexpected superior results need not be recited in the claims, they do not need even be in the specification. The PTO’s reviewing courts had repeatedly held that evidence and arguments directed to advantages not disclosed in the specification cannot be disregarded. See e.g. *In re Chu*, 66 F.3d 292, 298-99, 36 USPQ2d 1089, 1094-95 (Fed. Cir. 1995) (Although the purported advantage of placement of a selective catalytic reduction catalyst in the bag retainer of an apparatus for controlling emissions was not disclosed in the specification, evidence and arguments rebutting the conclusion that such placement was a matter of “design choice” should have been considered. “We have found no cases supporting the position that a patent applicant’s evidence or arguments traversing a § 103 rejection must be contained within the specification. There is no logical support for such a proposition as well, given that obviousness is determined by the totality of the record including, in some instances most significantly, the evidence and arguments proffered during the give-and-take of *ex parte* patent prosecution.” See also *In re Zenitz*, 333 F.2d 924, 928, 142 USPQ

158, 161 (CCPA 1964) (evidence that claimed compound minimized side effects of hypotensive activity must be considered because this undisclosed property would inherently flow from disclosed use as tranquilizer); *Ex parte Sasajima*, 212 USPQ 103, 104 - 05 (Bd. App. 1981) (evidence relating to initially undisclosed relative toxicity of claimed pharmaceutical compound must be considered). Furthermore, the specification need not disclose proportions or values as critical for applicants to present evidence showing the proportions or values to be critical. *In re Saunders*, 444 F.2d 599, 607, 170 USPQ 213, 220 (CCPA 1971).

c. Commercial Success Commensurate in Scope with the Claims and Derived From the Claimed Invention

Mr. Kanno further declared that the claimed inventive methods have achieved great commercial success, because of the high reduction rate and the elimination of the need to replace the catalysts frequently. As a consequence of the superiority of the presently claimed invention, over one hundred gas treatment plants have been built by Hitachi, assignee of the instant application. This success has been widely recognized, including by the governments of the United States and Japan, in the form of awards. *See* First Kanno Declaration, pages 3-4.

Okazake *et al.* (U.S. Pat. No. 5,151,263) and Imaura (U.S. Pat. No. 5,649,985) were cited as optional secondary references by the Office Action to reject a dependent claim (Claim 79). Because as indicated above the independent claims are patentable in view of Rossin *et al.*, and these secondary references do not in any way remedy the deficiencies of the primary reference, the claim rejection over the secondary references is also improper and should be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, the application is respectfully submitted to be in condition for allowance, and prompt, favorable action thereon is earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #056203.50311).

Respectfully submitted,

December 13, 2004



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